HHS Public Access

Author manuscript

J Evid Based Dent Pract. Author manuscript; available in PMC 2015 September 14.

Published in final edited form as:

J Evid Based Dent Pract. 2012 June ; 12(2): 110–112. doi:10.1016/j.jebdp.2012.03.028.

The Hall Technique may be an Effective Treatment Modality for Caries in Primary Molars

Margherita Fontana, DDS, PhD,

Associate Professor, Department of Cariology, Restorative Sciences, and Endodontics, University of Michigan School of Dentistry, 1011 N. University, Ann Arbor, MI 48109, Phone: 734-647-1225

Barbara F. Gooch, DMD, MPH, and

Associate Director for Science, Centers for Disease Control and Prevention, Division of Oral Health, Mailstop F10, 4770 Buford Highway, Chamblee, GA 30341

Michele L. Junger, DDS, MPH

Research Fellow, Centers for Disease Control and Prevention, Division of Oral Health, Mailstop F10, 4770 Buford Highway, Chamblee, GA 30341

Margherita Fontana: mfontan@umich.edu; Barbara F. Gooch: bfg1@cdc.gov; Michele L. Junger: ilk6@cdc.gov

SUMMARY

Subjects—From 2001 to 2004, 17 general dental practitioners (GDPs) in Tayside, Scotland, recruited 132 children aged 3 to 10 years at enrollment who had caries affecting matched pairs of asymptomatic primary molar teeth for participation in this split-mouth randomized controlled trial. Of these 264 study teeth with caries lesions, 42% were radiographically more than halfway into dentin, and 67% required Class II restorations. In 2000, the regional decayed/missing/filled teeth (DMFT) number was 2.47 (d_3 1.71; mt 0.54; ft 0.22). Ninety-one patients (69%) had 48 months minimum of follow-up, or both teeth had reached an end point (ie, extracted, exfoliated, censored) before this time.

Key Exposure/Study Factor—One molar tooth in the study pair was allocated to the Hall technique (HT) (intervention), and the contralateral tooth was allocated to the practitioner's usual treatment (control). Practitioners accessed computer-generated randomization for treatment allocation and order by telephoning a central administrator. According to the HT protocol, food could be removed from the cavity, but there was to be no other cavity preparation. The correct size of crown was selected, and the crown and tooth were washed and dried. The crown was filled with glass-ionomer cement (GIC) and seated with digital pressure before the child was instructed to

PURPOSE/QUESTION
Among a population at risk for dental caries, what percentage of restorations failed within 5 years after placement by sealing caries in primary molars (the Hall technique) compared with conventional restorative methods used by general dental practitioners in Scotland?

TYPE OF STUDY/DESIGN
Randomized controlled trial

LEVEL OF EVIDENCE
Level 2: Limited quality, patientoriented evidence

STRENGTH OF RECOMMENDATION GRADE
Not applicable

bite down hard to seat the crown fully. Excess GIC was removed, and the child was instructed to continue biting down until the cement had set.

Main Outcome Measure—Major failures were indicated by the signs and symptoms of irreversible pulpitis or dental abscess (requiring pulp therapy or extraction), interradicular radiolucency, restoration loss and unrestorable tooth, and internal root resorption.

Main Results—At 60 months, for 91 patients with at least 48 months of follow-up, major failures (ie, irreversible pulpitis, loss of vitality, abscess, or unrestorable tooth) were recorded for 18 teeth: 3 (3%) for HT (treatment arm) and 15 (16.5%) for the usual treatment (control) (P = .000488; number-needed-to-treat [NNT] = 8).

Conclusion—The authors concluded that sealing in caries by using the HT was more effective statistically and clinically, in the long term, and significantly outperformed the GDPs' standard restorations.

COMMENTARY AND ANALYSIS

This study focused on the effectiveness of sealing caries with a noninvasive restorative approach (ie, HT). Thus, we provide a brief review of the current state of the science related to restorative approaches for primary teeth, as well as minimal intervention strategies (ie, sealing caries and partial caries removal). Simpler, less invasive and more acceptable caries management strategies for primary teeth could enhance dental care among children in diverse settings.[1] Evidence ranges from a restoration of symptomless carious primary teeth not conferring any significant benefit over and above nonrestorative care,[2,3] to restoration of carious teeth substantially increasing the likelihood of a "successful" outcome— one in which the tooth subsequently exfoliates without the need for an extraction.[4]

The HT involves placement of a stainless steel crown (SSC) over a carious primary molar without caries removal, tooth reduction, or local anesthesia. According to the American Academy of Pediatric Dentistry, among children at high risk of caries, definitive treatment of primary teeth with SSC, including complete caries removal, is considered a better alternative over time than multisurface intracoronal restorations.[5] Clinical outcomes from lower levels of evidence (primarily retrospective analyses of patient records) have consistently favored the use of SSC.[6] A recent systematic review (SR) comparing SSC with amalgam fillings, however, found no randomized clinical trials (RCTs) for appraisal.[7] Similarly, another recent SR, which included only 3 trials that compared 3 different types of materials for restoration of primary teeth, found no significant differences for all of the outcomes assessed and concluded that there was insufficient evidence to make any recommendations about which filling material to use.[8]

Although management of carious lesions has been based on complete removal of carious tissue before tooth restoration, less invasive techniques that remove most but not all infected dentin (ie, partial caries removal) and seal or isolate the cariogenic bacteria from their nutrient source have provided successful treatment outcomes.[9] One SR of 4 RCTs found that partial caries removal in symptomless deep lesions in primary or permanent teeth reduces the risk of pulp exposure compared with complete removal. Thus, partial caries removal is

preferable to complete caries removal in the deep lesion to reduce the risk of carious exposure.[10]

Another SR of 6 studies found that pit-and-fissure sealants placed on permanent teeth without prior removal of carious tissue are effective in reducing bacteria levels in cavitated carious lesions.[11] In addition, another recent study of primary teeth showed that arrest of dentinal caries lesions was observed 3 to 6 months after sealing, which was characterized by a reduction of bacterial counts and changes in dentin color, consistency, and humidity, irrespective of baseline dentin characteristics.[12]

In this prospective split-mouth study conducted among GDPs, the HT resulted in few major failures, suggesting that sealing in caries in deciduous molars by using Hall crowns is a less invasive alternative to traditional restorative care. However, this RCT required a protocol that was acceptable to GDPs, which may have introduced some constraints on design and conduct that are important to consider when reviewing the findings. These constraints would include the standard restorative approaches of participating practitioners; patient age at enrollment; and dentists' treatment preferences, materials, and techniques. The authors report that the poor performance of the control restorations may have been explained by the extensive use of GIC (ie, used for 73% of restorations, with 68% being proximal). A recent SR concluded that high failure rates of GIC cannot support a recommendation for use in Class II cavities in primary molars, although there is evidence that resin-modified GIC can successfully restore small to moderate Class II lesions.[13] In addition, GIC is an accepted treatment alternative for the interim and definitive management of carious primary molars, especially among patients with a high risk of caries.[5,14] Furthermore, "no pulp therapies were provided by participating practitioners for any control teeth at the initial appointment," although more than 40% of the teeth for which radiographs of diagnostic quality were available (ie, 87% of 132 teeth at the initial appointment) had "advanced dental caries."[15,16] An earlier report of interim findings indicated that only 8% and 11% of control teeth received amalgam and composite restorations, respectively.[16] Use of local anesthesia and mechanical preparation of control teeth were not described. Thus, the procedures that make up standard restorations for control teeth in this study could not be replicated in subsequent studies and may not be generalizable to all practitioners.

The mean age of enrolled children was approximately 7 years,[16] and both study teeth had exfoliated in 48% of the 91 patients who reached an end point, although time to exfoliation or extraction is not reported. Findings, and perhaps technique, are not applicable directly to very young children with extensive caries, who account for a disproportionate share of available resources, when treatment in the operating room under general anesthesia is performed.[17] The HT requires a child to understand and tolerate biting the crown into position without any local anesthesia and possibly through tight contacts (ie, orthodontic separators were used for 13% of the Hall crowns, requiring an additional visit).[1,18] As the SSC is fitted with no tooth reduction, there is an initial increase in vertical dimension caused by a premature unilateral contact; however, the study found the following: an even occlusal contact had reestablished at the 1-year recall; no child visited the dentist following placement of the crown with signs or symptoms of occlusal dysfunction; and no child or parent reported difficulty with eating or symptoms of temporomandibular joint dysfunction

at the 1-year or 2-year recalls.[16] As stated by Rosenblat[18] in 2008, however, it is unclear if children or parents would be likely to report this type of discomfort.

In conclusion, not finding many major failures in the treatment group (HT) provides level 2 evidence for the HT, according to the SORT. In addition, the lack of many major failures provides strong justification for additional RCTs by using standard treatments that can be replicated in different contexts and among different groups, such as countries, patients, especially younger patients, and practitioners.

Acknowledgments

SOURCE OF FUNDING

3M/ESPE and EastRen with additional support through a research training grant by the Chief Scientist Office, Scottish Executive

References

1. Innes NPT, Stirrups DR, Evans DJP, Hall N, Leggate M. A novel technique using preformed metal crowns for managing carious primary molars in general practice—a retrospective analysis. Br Dent J. 2006; 200:451–4. [PubMed: 16703041]
2. Tickle M, Milsom K, King D, Kearney-Mitchell P, Blinkhorn A. The fate of the carious primary teeth of children who regularly attend the general dental service. Br Dent J. 2002; 192:219–23. [PubMed: 11931484]
3. Levine RS, Pitts NB, Nugent ZJ. The fate of 1,587 unrestored carious deciduous teeth: a retrospective general dental practice based study from northern England. Br Dent J. 2002; 193:99–103. [PubMed: 12199130]
4. Stephenson J, Chadwick BL, Playle RA, Treasure ET. A competing risk survival analysis model to assess the efficacy of filling carious primary teeth. Caries Res. 2010; 44:285–93. [PubMed: 20516690]
5. American Academy of Pediatric Dentistry, Council on Clinical Affairs. Policy on Interim Therapeutic Restorations (ITR). 2008. Available at: http://www.aapd.org/media/Policies_Guidelines/P_ITR.pdf. Accessed January 2, 2012
6. Randall RC. Preformed metal crowns for primary and permanent molar teeth: review of the literature. Pediatr Dent. 2002; 24:489–500. [PubMed: 12412964]
7. Innes NP, Ricketts DN, Evans DJ. Preformed metal crowns for decayed primary molar teeth. Cochrane Database Syst Rev. 2007; (1):CD005512. [PubMed: 17253559]
8. Yengopal V, Harnekar SY, Patel N, Siegfried N. Dental fillings for the treatment of caries in the primary dentition. Cochrane Database Syst Rev. 2009; (2):CD004483. [PubMed: 19370602]
9. Thompson VP, Craig RG, Curro FA, Green WS, Ship JA. Treatment of deep carious lesions by complete excavation or partial removal: a critical review. J Am Dent Assoc. 2008; 139:705–12. [PubMed: 18519994]
10. Ricketts DN, Kidd EA, Innes N, Clarkson J. Complete or ultraconservative removal of decayed tissue in unfilled teeth. Cochrane Database Syst Rev. 2006; (3):CD003808. [PubMed: 16856019]
11. Oong EM, Griffin SO, Kohn WG, Gooch BF, Caufield PW. The effect of dental sealants on bacteria levels in caries lesions. A review of the evidence. J Am Dent Assoc. 2008; 139:271–8. [PubMed: 18310731]
12. Lula EC, Almeida LJ Jr, Alves CM, Monteiro-Neto V, Ribeiro CC. Partial caries removal in primary teeth: association of clinical parameters with microbiological status. Caries Res. 2011; 45:275–80. [PubMed: 21576960]
13. Chadwick B, Evans DJ. Restoration of class II cavities in primary molar teeth with conventional and resin modified glass ionomer cements: a systematic review of the literature. Eur Arch Paediatr Dent. 2007; 8:14–21. [PubMed: 17394886]

14. American Academy of Pediatric Dentistry, Clinical Affairs Committee – Restorative Dentistry Subcommittee. Guideline on Pediatric Restorative Dentistry. 2008. Available at: http://www.aapd.org/media/Policies_Guidelines/G_Restorative.pdf. Accessed January 2, 2012

15. Innes NP, Evans DJ, Stirrups DR. Sealing caries in primary molars: randomized control trial, 5-year results. J Dent Res. 2011; 90:1405–10. [PubMed: 21921249]

16. Innes NP, Evans DJ, Stirrups DR. The Hall Technique: a randomized controlled clinical trial of a novel method of managing carious primary molars in general dental practice: acceptability of the technique and outcomes at 23 months. BMC Oral Health. 2007; 7:18. [PubMed: 18096042]

17. Griffin SO, Gooch B, Beltrán ED. Dental services, costs, and factors associated with hospitalization for Medicaid eligible children, Louisiana 1996–1997. J Publ Health Dent. 2000; 60:21–7.

18. Rosenblatt A. The Hall technique is an effective treatment option for carious primary molar teeth. Evid Based Dent. 2008; 9:44–5. [PubMed: 18584001]